

REMARKS

I. Status of the Claims

Claims 1-25 are pending in this application. No claims have been amended by this submission. Claims 1-25 remain rejected under 35 U.S.C. § 102(b) and/or 35 U.S.C. § 103(a) as anticipated by or as obvious over U.S. Patent No. 5,227,419 to Moczygemba et al. (“Moczygemba”), and under 35 U.S.C. § 102(b) and/or 35 U.S.C. § 103(a) as anticipated by or as obvious over U.S. Patent No. 6,162,867 to Guntherberg et al. (“Gunterberg”). Each of these rejections is addressed in more detail below.

II. Rejection over Moczygemba

In the outstanding rejection, the examiner has maintained his rejection of claims 1-25 over Moczygemba, arguing that the block copolymer of Moczygemba of run 2 meets all of the claimed limitations because Moczygemba discloses producing block copolymers by methods comprising some reactants similar to those used to produce certain block copolymers claimed by applicants. Office Action at 2-3. The examiner also finds it “unreasonable to assume that none of the styrene in the step 4 monomer charge will be incorporated into the terminal polystyrene block arising from the final step 5 charge of styrene.” Office Action at 5. Applicants submit that this position is refuted by the disclosure of Moczygemba itself, and respectfully request that this rejection be withdrawn.

To review, applicants previously argued in its response dated June 23, 2009, that Moczygemba teaches a method of generating block copolymers in example 2 which does not anticipate or render obvious the claimed block copolymer. Example 2 teaches a polymer synthesis comprising 5 steps: (i) mixing 0.016 phm n-butyllithium (NBL) as an

initiator to 30 phm styrene; (ii) adding a second charge of 0.058 phm NBL and 12 phm styrene; (iii) adding 12.5 phm butadiene; (iv) adding 17.5 phm styrene and 17.5 phm butadiene; and finally (v) adding 10.5 phm styrene. Col. 9, lines 30-61. It is not disputed that steps 1, 2, and 5 add homopolystyrene to the block copolymer that is formed, since only styrene is added during those steps. It is also not disputed that step 3 does not add any appreciable amount of homopolystyrene since no styrene is added during that step. In addition, applicants' calculations which are detailed in the response dated October 28, 2008, at pages 6-11, show that steps 1, 2, and 5 combine to form at most, 38% by weight of a block having a molecular weight of 35,000 or less among the styrene blocks. Thus, the only point of dispute between applicants and the examiner is whether step 4 adds any appreciable amount of homopolystyrene to the mixture, which applicants submit that it does not.

Specifically, Moczygemba itself recognizes that step four adds a "random tapered block of polymerized styrene and butadiene." Col. 9, lines 3-6. More specifically, Moczygemba distinguishes between polystyrene blocks that it labels as "S" and from these "taper" blocks of random polymerized styrene and butadiene because Moczygemba appreciated that the tapered blocks (made by step 4) do not contain appreciable amounts of polystyrene blocks. See *id*. Furthermore, since the polymerization in step 4 takes place in the presence of both styrene and butadiene, Moczygemba understood that random polymerized combinations would arise—not blocks of homopolystyrene. Were this not the case, Moczygemba would have likely called this an S/B block to indicate some sort of homopolymerization of styrene and butadiene blocks, instead of calling them taper blocks.

In addition, applicants submit that claims 7 and 8 are neither anticipated nor rendered obvious by Moczygembba since the reference fails to teach the inclusion of isoprene and fails to suggest the inclusion of isoprene as a conjugated diene incorporated in the claimed block copolymer. On the other hand, claims 7 and 8 both require that the claimed block copolymer include a block comprising isoprene. Thus, applicants submit that claims 7 and 8 are allowable over Moczygembba for at least this separate reason.

III. Rejection over Guntherberg

In the outstanding rejection, the examiner has also maintained the rejection of claims 1-25 over Guntherberg on the grounds that it produces materials in a similar manner in its specification as compared to the present application's examples. Office Action at 3. Applicants respectfully disagree, and submit that the examiner's argument regarding mixed charges of styrene/butadiene do not apply to Guntherberg.

Table 1 of Guntherberg provides the amounts of butadiene and styrene that are added during the polymerization process, and goes on to characterize the polymer obtained as being in the form A-B/A-A, where A represents homopolystyrene block and B/A represents "a block comprising randomly polymerized styrene and hydrogenated butadiene units." Col. 14, lines 29-32. Thus, contrary to the examiner's position, Guntherberg explicitly teaches that its mixed butadiene/styrene block comprises **random** units, and therefore cannot produce homopolystyrene blocks. In comparison, the styrene from steps 1 and 5 can form homopolymers with average polymerization degree of 30 or more but their overall weight only amounts to $(1048 + 1048) / (1048 + 1477 + 1477 + 1477 + 1048)$, or 32% of the overall styrene (including styrene randomly polymerized with butadiene). Since the present claims require 40% to 80% by weight of

styrenes having an average polymerization degree of 30 or more and having a molecular weight of 35,000 or less, Guntherberg fails to anticipate or render obvious all of the pending claims and are allowable over Guntherberg for at least this reason.

Additionally, applicants again submit that claims 7 and 8 are neither anticipated nor rendered obvious by Guntherberg since the reference also fails to teach the use of isoprene in the claimed fashion. As an initial matter, applicants acknowledge that claim 9 of Guntherberg teaches using isoprene as the diene monomer. However, the context in which Guntherberg teaches this use is wholly different from the claimed invention, as it uses it as part of Guntherberg's claim 1 composition—a copolymer block comprising **random** units of vinylaromatic monomer and diene (isoprene). This is in stark contrast to the presently claimed block copolymer of styrene and conjugated diene. Specifically, random units of vinylaromatic monomer and isoprene cannot form styrene blocks having an average polymerization degree of 30 or more. For at least this separate reason, claims 7 and 8 are allowable over Guntherberg.

IV. Conclusions

Applicants respectfully request that the examiner withdraw the rejections of claims 1-25 under 35 U.S.C. 102(b), or in the alternative 103(a). For each of the disclosures cited by the examiner to support these rejections, the synthetic procedure disclosed would not produce a block copolymer within the limits recited in Applicants' claims. Additionally, the examiner has not provided any objective evidence that shows reasons for why one would modify any of the cited references to arrive at Applicants' claims. Accordingly, Applicants respectfully request that the examiner withdraw the rejections of claims 1-25 under 35 U.S.C. 102(b), or in the alternative 103(a).

If there are any fees due in connection with the filing of this response, please charge the fees to Deposit Account No. 06-0916. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our deposit account.

Respectfully submitted,

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